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Michael Moran Associates, L.L.C.  
Water Quality/Hydrogeology/Geochemistry  
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**Ex. 6 PII, Robert Moran**

## **EDUCATION**

University of Texas, Austin: Ph.D., Geological Sciences, 1974  
San Francisco State College: B.A., Zoology, 1966

## **PROFESSIONAL HISTORY**

Michael-Moran Associates, LLC, Partner, 2003 to present  
Moran and Associates, President, 1983 to 1992; 1996 to 2003  
Woodward-Clyde Consultants, Senior Consulting Geochemist, 1992 to 1996  
Gibbs and Hill, Inc., Senior Hydrogeologist, 1981 to 1983  
Envirologic Systems, Inc., Senior Hydrogeologist/Geochemist, 1980 to 1981  
Tetra Tech Intl./ Sultanate of Oman, Senior Hydrogeologist, 1979 to 1980  
Science Applications, Inc., Geochemist/Hydrologist, 1978 to 1979  
U.S. Geological Survey, Water Resources Division, Hydrologist/Geochemist, 1972 to 1978  
Texas Bureau of Economic Geology, Research Scientist Assistant, 1970 to 1971

## **REPRESENTATIVE EXPERIENCE**

Dr. Moran has more than thirty-eight years of domestic and international experience in conducting and managing water quality, geochemical and hydrogeologic work for private investors, industrial clients, tribal and citizens groups, non-governmental organizations, law firms, and governmental agencies at all levels. His experience includes the following representative project assignments:

- IKV Pax Christi (Netherlands), Bogota, Colombia. Prepare mining-environmental best practices report for presentation to Colombian Ministry of Environmental Affairs.
- Oglala Sioux Tribe, Western Mining Action Project, Gonzalez Law Firm, South Dakota. Review of Powertech License Application and provide expert opinions: Dewey-Burdock In Situ Uranium Project.
- Comisión de Gestión Integral de Aguas de Bolivia (Commission for the Integrated Management of Bolivian Waters) and Federación Regional Única de los Trabajadores Campesinos del Altiplano Sud (Regional Farmers Federation of the Southern Altiplano), Bolivia. Review of present mining activities and documents related to the San Cristobal Mine. Activities funded by the Municipality of Colcha K (Potosí, Bolivia), the Centro de Estudios de la Universidad de San Simón, Cochabamba, and Global Green Grants Fund.

- Shute, Mihaly & Weinberger / San Diego State University Research Foundation. Review of hydrogeologic / environmental impacts associated with quarry construction near a university wildlife refuge.
- Sarah Vogel Law Firm, North Dakota. Litigation support and evaluation of environmental impacts resulting from a release of oilfield waters onto livestock lands and waters.
- IKV Pax Christi (Netherlands), Tolima, Colombia. Technical review of proposed La Colosa gold project (Anglo Gold Ashanti); interaction with regulators, civil society and company; prepare recommendations & report.
- Thompson Divide Coalition, Western Colorado. Technical assistance to a consortium of environmental groups in designing and conducting a baseline water sampling program in anticipation of gas drilling activities.
- Global Green Grants / Nature's Own, Papua New Guinea. Prepare technical / policy papers on marine disposal of mining wastes.
- SAVIA, School of Ecological Thought / Comision Pastoral Paz y Ecologia, Guatemala. Presentations on ecological aspects of resource legislation to Guatemalan government ministries, high-level officials, and educational institutions. Conduct water quality training classes; assist with development of laboratory capabilities.
- Astrella & Rice, Colorado, U.S.A. Technical assistance in preparing litigation arguments for citizen lawsuit involving alleged drinking water contamination by oil and gas activities.
- Office of the Prime Minister, Iraqi Kurdistan. Development of information infrastructure and management training for numerous ministries in Northern Iraq; done in partnership with faculty of American University, Washington, D.C. Headed an audit team for the Regional Statistics Organization.
- Southwest Research and Information Center / Buryat Regional Organization on Baikal / Mongolia Nature Protection Coalition; Buryatia, Siberia, Russia and northern Mongolia. Technical information exchanges with local NGOs, government officials and mining company staffs.
- Rulison Citizens Group / Public Counsel of the Rockies. Colorado. Development of technical arguments and potential litigation support intended to define environmental issues related to gas development near the Rulison underground nuclear test site. Hearing testimony.
- The Nature Conservancy, Trout Unlimited, Alaska Conservation Foundation, Trustees for Alaska and Renewable Resources Coalition, Alaska. Presentations to public interest groups and development of technical issues and papers relating to construction of the Pebble copper-molybdenum-gold mine, proposed for operation above the largest sockeye salmon fishery in the world.
- Wild Salmon Center, Alaska. Technical evaluation of hydrogeological, and chemical issues that may impact fisheries near the proposed Pebble Mine.

- Miller, Axline & Sawyer / Meyers, Nave, Riback, Silver & Wilson / City of Grass Valley, California. Technical and litigation support in a suit alleging contamination by Newmont Mining Corporation; deposition testimony.
- Latin American Water Tribunal. San Salvador, El Salvador. Prepare presentations and conduct workshops on water and water quality. Funding: Heinrich Boll Foundation.
- Alburnus Maior, Rosia Montana, Romania. Evaluation of EIA and preparation of summary report on a proposed gold mine in Transylvania. Funded by the Staples Trust, U.K. and the Open Society Foundation, Romania.
- Asociacion de Desarrollo Social Santa Marta (ADES), El Salvador. Evaluate EIA and related documents, El Dorado Mine; technical presentation at national forum; prepare review report. Funded by DIAKONIA, Swedish Ecumenical Action.
- Alburnus Maior, Romania. Review documents and prepare comments related to development of proposed Rosia Montana Mine for a Romanian NGO.
- La Lumiere, Senegal and WACAM, Ghana. Conducted water quality training sessions for NGO and government staffs, as related to mining and other development activities. Funded by Oxfam America.
- ESRI (Environmental Systems Research Institute). Provide technical assistance to several Iraqi Ministries to define information management needs, deploy map-based systems (GIS), and establish a Middle East-based Center of Excellence to support these ministries.
- Colectivo Madre Selva, Guatemala. Evaluation of Marlin Mine site, review of EIA and preparation of report; attendance at national and indigenous mining forums; conducted water quality training; review of CAO / IFC documents. Funded partly by Misereor, Catholic Bishops' Development Organization, Germany.
- International Union for Conservation of Nature and Natural Resources (IUCN, Switzerland). Review of the Mining and Metals Supplement of the Global Reporting Initiative (GRI).
- World Bank, Extractive Industry Review. Member of Advisory Group assisting WB in evaluating extractive industry practices; London, Lisbon.
- Nishnawbe Aski and other Ontario First Nation bands---Ontario, Canada. Review of environmental documents relating to Montcalm Mine, a proposed copper-nickel facility. Activities paid for by Falconbridge Limited.
- Kazakh Institute of Physics and Technology / ISTC---Almaty, Kazakhstan. Technical oversight of environmental program, evaluating migration of radionuclides at the Semipalatinsk Nuclear Test site.
- Greenpeace Argentina / Mineral Policy Center---Esquel, Argentina. Review of EIA (water, environ. issues) and conditions at proposed mine in Patagonia.
- Oxfam America / Sahel Development Foundation ---Syama Mine, Southern Mali. Review of environmental conditions and documents related to an IFC-funded gold mine (2003); conduct technical workshops and policy meetings with Mali government and press (2004).

- Kivalina Relocation Planning Committee---Alaska. Litigation support to Center on Race, Poverty & the Environment regarding water quality issues, Red Dog Mine. Deposition testimony.
- Asociacion de Organismos No Gubernamentales---Santa Rosa de Copan, Honduras. Independent review of water / environmental issues at San Andres mine; funded by Dan Church Aid (Danish government and NGOs) and Christian Aid (English NGO).
  - Oxfam America / Friends of the Earth Int'l. / Global Green Grants---Quellaveco, Peru. Independent review of mining, water and environmental issues at request of Asociacion Civil "Labor", Lima.
  - Oxfam America / Mineral Policy Center / Environmental Mining Council of B. C.: Tambogrande, Peru. Independent review of mining water and environmental issues. Includes numerous public presentations to citizens and governmental groups, including members of the Peruvian Congress.
  - New Mexico Environment Department---New Mexico. Review of cost estimates for water treatment systems for closure plans / bonding calculations, Chino and Tyrone Mines.
  - International Institute for Environment and Development---London, U.K. Consultant to MMSD project on sustainable development / mining issues.
  - Technical Chamber of Greece---Thrace, Greece. Technical assistance to an advisory arm of the Greek government and citizens groups regarding gold mining / environmental issues.
  - Malerah-Wahlabul Native Title Claimants / Friends of the Earth---Sydney, Australia. Review of water quality issues related to cyanide leach gold operations on aboriginal lands, and testimony at Land and Environment Court.
  - Loeb Aron & Co.---London, U.K. Preparation of report evaluating the Baia Mare, Romania waste spill for an investment banking firm.
  - Centro de Investigacion y Planificacion del Medio Ambiental (CIPMA) / World Resources Institute / International Development Research Centre---Chile. Evaluation of environmental costs associated with copper mining in Chile.
  - Carl Duisberg Gesellschaft / Univ. of Witwatersrand / United Nations---South Africa. Teaching cyanide technology and environmental technology assessment issues.
  - Dogrib Nation / Pape and Salter---Yellowknife, Canada. Geochemical consulting and testimony regarding the proposed Diavik diamond mine.
  - Soros Foundation Kyrgyzstan---Bishkek, Kyrgyzstan. Water quality instruction to regulators and NGOs regarding mining, sampling, laboratory procedures, and general environmental issues. Review laboratory.
  - General Chemical / Sierra Club---Piceance Basin, Colorado. Review of water quality, treatment, legal and policy issues regarding the proposed Yankee Gulch soda ash mine; hearing testimony.

- Sierra Club Legal Defense Fund / Okanogan Highlands Alliance---Crown Jewel Mine, Washington. Litigation support on water quality, geochemistry, treatment issues to groups opposing proposed gold operation; test case on federal mining law; deposition testimony.
- National Wildlife Federation---Carlota Mine, Arizona. Litigation support for challenge of EPA regarding water quality/ treatment issues at copper mine. Review of TMDL issues related to Pinto Creek for NWF and local citizens.
- International Rivers Network---Review of proposed dam project and associated mine water quality issues at the San Roque site, Philippines.
- Mineral Policy Center---Preparation of technical documents on the environmental behavior, analysis and toxicity of cyanides.
- Holnam Industries---Penrose, Colorado. Ground water quality/ geochemistry study for cement operation.
- World Resources Institute---mining water quality/ geochemistry assistance on Venezuelan forestry / mining environmental regulations, and on environmental economics of copper mining practices, Chile.
- U.S. EPA / American Geological Services---French Gulch, Colo. Geochemical / treatment /remediation support at an abandoned mine site; negotiated Superfund issues.
  - Stoel Rives---Richmond Hill Mine, So. Dakota. Review water quality treatment and geochemistry issues at a closed gold mine site with discharge violations.
  - Nacho Nyak Dun First Nation/ Pape and Salter---Yukon, Canada. Evaluation of proposed heap-leach gold mining facilities and practices for native group and barristers.
  - Molycorp/ Unocal---Questa, New Mexico. Review of water quality/ geochemical / aquatic biology issues at a molybdenum mine/ mill site.
- Homestake Mining< Lead, South Dakota, U.S.A. Review of water quality and geochemical problems and waste rock storage and tailings stability issues.
- U.S. Bureau of Land Management / Summo Minerals---Lisbon Valley, Utah. Review of water quality and geochemistry, and assistance in preparation of an EIS at a proposed copper mining and recovery site.
- Southern Peru Copper Corp. -Toquepala, Peru. Design and oversight of water quality, geochemistry, and remediation issues at an open-pit copper mine, mill, and waste facilities.
- Cortez Mining/ Placer Dome / U.S. Bureau of Land Management - Pipeline Project, Nevada. Review of water quality and geochemistry and preparation of EIS-related reports at this proposed open pit gold site.

- Kennecott Utah Copper. Interacted with the law firm of Bogle and Gates to assist an active metal mining company in defending against a CERCLA listing. Activities involved interpreting water quality/geochemical and other environmental data within the Hazardous Ranking System (HRS) context.
- Asarco - Leadville, Colorado. Oversight of water quality and geochemical activities at a historic metal mining and processing site where the client is involved in CERCLA negotiations. Interaction with State and EPA representatives and legal staff.
- Cambior Minerals - Metates Mine, Mexico. Water quality and geochemistry evaluation of a new gold property.
- Fraser Stryker and the Lindsey Chemical Co. - Nebraska. Technical support to legal staff involved in negotiations regarding a Superfund industrial processing site.
- W.R. Grace - Motorwheel Site, Michigan. Technical assistance to Grace legal staff involved in CERCLA negotiations at a hazardous waste site.
- Zortman Mining Co./U.S. Bureau of Land Management. Technical and management responsibilities for water resources and geochemistry tasks in preparation of revised EIS at a gold-cyanide leach site with existing acid drainage problems.
- Echo Bay Mining, Lamfoot Mine, Republic, Washington. Responsible for geochemistry and water quality aspects of a supplemental EIS at a new gold mine site. Development of monitoring, testing and remedial recommendations to the BLM.
- Angelina Farms, Louisiana. Technical support to legal staff of oil production companies accused of contaminating groundwaters with brines.
- Chino Mines, New Mexico. Technical evaluation of water quality and geochemical issues associated with leaching operations at an operating copper facility.
- Amax Gold/Haile Mining, South Carolina. Water quality consulting at a gold mining site with existing acid drainage problems.
- Shea and Gardner / Rockwell--Rocky Flats Plant, Colorado. Reviewed and evaluated geochemical studies; proposed future activities in preparation of potential litigation.

- Saunders, Snyder, Ross and Dickson/American Water Development, Inc. - San Luis Valley, Colorado. Coordinated water quality and geochemistry activities in support of water rights litigation. Oversaw water quality sampling, evaluated water quality and remote sensing data, assisted attorneys in technical strategy development and opponents' depositions; supplied deposition testimony.
- Arnold and Porter/Keystone Ski Corporation - Keystone, Colorado. Designed water quality and geochemical sampling program for ski area expansion in a previously mined area. Evaluated data and proposed remediation activities.
- Advanced Sciences, Inc./EG&G - Rocky Flats Plant, Colorado. Evaluated existing water quality and geochemical sampling programs; prepared document on non-facility related sources of chemical constituents and background.
- City of Brighton - Brighton, Colorado. Evaluated existing surface and groundwater quality data and suggested remedial activities to deal with excessive manganese and dissolved organic concentrations. Provided testimony to City Council.
- Chadwick & Associates, Inc./Newmont Mining - Telluride, Red Mountain, Colorado. Provided diverse water quality and geochemical consulting relating to remediation of acid mine drainage problems.
- Intergraph Corp. - Reston, Virginia. Assisted in technical development and marketing of a new environmental data management/GIS product.
- U.S. Forest Service - Salmon, Idaho. Acted as a geochemical/water quality consultant at the Beartrack mine site, a proposed cyanide-leach gold project.
- Earth Satellite Corporation/Navajo Nation/Patton, Boggs, and Blow - Window Rock, Arizona. Conducted a preliminary reconnaissance of water resources on the joint-use area of the Navajo/Hopi reservations using satellite imagery.
- Mission-Viejo/Morrison and Forester - Denver Basin, Colorado. Acted as a geochemical consultant in a groundwater rights dispute.
- Bunker Hill Corporation/Dames and Moore - Kellogg, Idaho. Reviewed field and laboratory water quality procedures at a CERCLA metal-mining and processing facility. Audited proposed laboratory.

- Saunders, Snyder, Ross, and Dickson/Adolph Coors Company - Golden, Colorado. Water quality consultant; reviewed data from Central City/Blackhawk, CERCLA site, and determined potential impact to the Coors water treatment plant. Provided testimony at stream classification hearings, Colorado Water Quality Control Commission.
- Colorado Water Resources and Power Authority - San Luis Valley, Colorado. Conducted water quality/geochemical and Landsat evaluations of deep groundwater to aid in development decisions.
- Armstrong, Teasdale, Kramer, Vaughan, and Schlafly / Anschutz Corp.-- Fredricktown, Missouri. Supervised technical activities of a CERCLA / SARA-related lawsuit; acted as a technical liaison with attorneys and regulators; managed consultants; authored reports; deposition testimony.
- Holland and Hart/White and Jankowski/Weller, Friedrich, Ward and Andrew/Breckenridge Ski Corporation - Breckenridge, Colorado. Technical supervision of water quality-related issues in a private lawsuit against Breckenridge Ski Corporation. Managed sampling and data interpretation; interacted with attorneys on strategy and assisted at depositions; authored reports; expert witness.
- Dames and Moore/Hecla Mining Corporation - Leadville, Colorado. Acted as hydrogeological/geochemistry consultant to Hecla on a natural resources damage suit; interacted with attorneys at Davis, Graham and Stubbs.
- Dames and Moore/Davis, Graham and Stubbs - Eagle Mine, Colorado. Supervised water quality/hydrogeology activities in preparation of a legal defense of Gulf and Western Corporation versus the State of Colorado in a natural resources damage suit; supervised and participated in all sampling; QA activities and report preparation; interacted with attorneys and regulators; assisted at depositions; deposition testimony; testified before Colorado Water Quality Control Commission on appropriateness of proposed metals standards.
- Jacobs Engineering - Albuquerque, New Mexico. Prepared policy documents on water quality/geochemistry procedures associated with the Uranium Mill Tailings Remedial Actions Project (UMTRA).
- University of Wisconsin. Designed a proposed groundwater exploration program for Gambia, West Africa, in conjunction with Earth Satellite Corporation.



- Harza Engineering Company/University of Michigan - Senegal, Guinea, and Gambia, West Africa. Evaluated potential impacts of new dam construction within the Gambia River basin. Reviewed local hydrogeology, mining production and exploration data; interacted with local officials.
- Engineering-Science, Inc. Faisalabad, Pakistan. Assisted in design of a well field for a groundwater supply in the central Punjab where high salinity and TDS were major problems; negotiated with local officials; prepared reports for Asian Development Bank.
- Holme Roberts and Owen - Canon City, Colorado. Reviewed and interpreted existing hydrogeology and water quality data at the Cotter uranium mill and tailings; proposed future activities; interpreted background concepts, prepared position papers for attorneys in negotiations with State of Colorado.
- Earth Satellite Corporation - Sultanate of Oman. Conducted an interpretive study of regional groundwater potential in Oman, with the staff of Earth Satellite Corporation. Activities included interpretation of existing geology and Landsat imagery combined with conventional low altitude flight and ground reconnaissance. Prepared reports for government of Oman.
- Anschutz Mining Corporation - Fredericktown, Missouri. Managed water resource-related activities for environmental baseline studies at a proposed cobalt/ nickel mine. Designed sampling programs, oversaw sampling, data interpretation, and report preparation.
- Kemmerer Coal Company - Frontier, Wyoming. Managed and conducted hydrogeologic and water quality studies at a proposed open-pit coal mine. Supervised well installation, aquifer testing, sampling, report preparation; interacted with state regulators.
- Anaconda Copper Company - Rico, Colorado. Conducted an investigation of hydrology, water chemistry, and aquatic biology at a complex ore mining district.
- Union Carbide Corporation - Uravan, Colorado. Managed and conducted a water quality monitoring program for a proposed uranium tailings disposal area and effluent evaporation basin. Assisted in design of geochemical testing program to evaluate potential leachate quality.
- Anschutz, Mining Corporation - Laredo, Texas. Managed and conducted an investigation of groundwater hydrology and soils geochemistry and associated hazardous wastes at a metal ore handling and reagent storage

facility. Designed sampling protocol; prepared reports; negotiated with state regulators; interacted with attorneys at Baker, Botts.

- Snowmass Coal Company - Carbondale, Colorado. Managed and conducted hydrogeology investigation of an underground coal mine with steeply dipping seams.
- Marline Uranium Corporation/Union Carbide Corporation - Danville, Virginia. Managed water resources portion of a baseline investigation at a proposed hard-rock uranium mine site. Oversaw well installation monitoring programs and dewatering investigations.
- Southern Pacific Petroleum - Means, Kentucky. Conducted baseline hydrogeological/geochemical investigations at a proposed oil shale mine and retort facility.
- Central Arizona Association of Governments - Globe/Miami, Arizona. Conducted study to determine hydrogeologic/geochemical impact of long-term copper mining and processing facility. Designed monitoring programs; interacted with federal, state, local and tribal officials; prepared numerous reports.
- United Nuclear - Homestake Partners - Milan, New Mexico. Conducted hydrogeological/geochemical evaluation of an existing monitoring program for a uranium milling and waste-disposal facility.
- Sultanate of Oman/Tetra Tech International - Muscat, Oman. Member of Water Resources Council Staff, Sultanate of Oman, based in Muscat, Oman. The Water Resources Council was an interministerial body intended to coordinate all water-related activities within the Sultanate. Duties involved planning and design of surface and groundwater projects (both exploration and utilization) for the Omani government; development of water resources policy for the government; hydrogeological field work on both exploration and resource characterization projects - aquifer testing, borehole geophysics, water quality sampling, hydrogeologic mapping; review of work performed (or planned) by other consultants to the government, published reports on water resources of Oman.
- EG&G - Idaho National Engineering Laboratory, Idaho Falls, Idaho. Managed a hydrologic investigation of transuranic nuclide migration in groundwater. Contributed geochemical expertise to evaluation of waste isolation and transport modeling.

- Kerr-McGee Corporation - Grants, New Mexico. Conducted investigation into geochemistry of selenium associated with uranium mining/ milling.

While with the U.S. Geological Survey Water Resources Division, Dr. Moran was responsible for the design, management, and implementation of the following hydrogeological / geochemical studies:

- Metal-Mine Drainage - Colorado. Study of extent and magnitude of mining and mine drainage on the quality of Colorado streams.
- Selenium in Groundwater - Golden, Colorado. Hydrogeological/geochemical investigation of selenium and associated constituents at the margins of Rocky Flats nuclear plant.
- Geothermal Resources - Colorado. Reconnaissance investigation of potential geothermal resources throughout Colorado.
- Underground Coal Mine Water Quality - Colorado. Evaluation of existing and potential water quality problems from underground coal mines.
- In Situ Uranium Leaching - Grover, Colorado. Study of geochemical and hydrologic processes associated with in situ uranium mining and reinjection of waste products.
- Alluvial Metal Transport - Telluride, Colorado. Investigation of metal movement from tailings ponds into alluvium.
- Southwest Colorado Groundwater - Colorado. Study to determine availability and quality of groundwater in southwestern Colorado.
- Oil Shale Waters - Piceance Basin Colorado. Evaluation of disposal of saline groundwater discharged to the surface during oil shale development.
- Grace Coal Site - Axial Basin, Colorado. Hydrogeological /water quality study of proposed open-pit coal site.

**PUBLICATIONS, REPORTS AND PRESENTATIONS**

Moran, R.E. 1974. Trace element content of a stream affected by metal-mine drainage, Bonanza, Colorado. University of Texas at Austin. Ph.D. dissertation. 168 pp.

Moran, R.E. and D.A. Wentz, 1974. Effects of metal-mine drainage on water quality in selected areas of Colorado, 1972-1973. Colorado Water Conservation Board. Water Resources Circular No. 25, 250 pp. [Bibliograph. Ref at:  
<http://co.water.usgs.gov/publications/pubsnonusgs.html>  
<http://bcn.boulder.co.us/basin/cgi-bin/biblio/GetRec.cgi?123>  
<http://openlibrary.org/b/OL4857524M>

Moran, R.E. and D.A. Wentz, 1974. Thermodynamic constraints on Metal Solubilities in a stream affected by mine drainage, Bonanza, Colorado. pp. 54-64, in *Water Resources Problems Related to Mining*. Hadley, R.F. and D.T. Snow (eds.). American Water Resources Association. Minneapolis, Minnesota. 236 pp.

Moran, R.E. and D.A. Wentz, 1974. Trace element content of a stream affected by metal-mine drainage, Bonanza, Colorado pp. 84-91 IN: International Symposium on Water-Rock Interaction Proc. Cadek, J. and T. Paces (eds.). Prague, Czechoslovakia. September 9-19, 1974. Geological Survey, Prague. 464 pp.

Moran, R.E., 1976. Geochemistry of Selenium in Groundwater near Golden, Jefferson County, Colorado. Abstracts with Programs, Geological Society of America. 1976 Annual Meeting. November 8-11, 1976. 8(6):1018.

Moran, R.E. 1978. Migration of Transuranic Nuclides in the Snake River Plain Aquifer, Idaho National Engineering Laboratory, Southeastern Idaho. Submitted to EG&G Idaho.

Moran, R.E. 1979. Available and Potential Water Resources of Oman. Submitted to Water Resources Council, Sultanate of Oman.

Moran, R.E. and J.V. Rouse, 1981. Procedures for Collection of Water Quality Samples and Data. Envirologic Systems, Inc. Denver, Colorado. 61 pp. Prepared for the Central Arizona Assoc. of Gov'ts.

Moran, R.E. 1984. Impacts of Proposed Mining and Hydrogeological Activities on Development within the Gambia River basin, Senegal, Guinea and Gambia. Submitted to Harza Engineering.

Moran, R.E. 1984. Preliminary Design Report, Groundwater Supply, Faislabad, Pakistan. Submitted to Engineering Science, Inc.

Harlan, R.L. and R.E. Moran, 1986. Closure of Metal Mining Sites: Hydrologic, Environmental and Legal Issues. Abstracts from Society of Mining Engineers Meeting, September 7-10, 1986, St. Louis, Missouri.

HRS Water Consultants and R.E. Moran, 1987. San Luis Valley Confined Aquifer Study. Three reports prepared for the Colorado Water Resources and Power Development Authority.

[http://digital.library.colostate.edu/cdm4/document.php?CISOROOT=/cowaters&CISO\\_PTR=4681&CISOSHOW=4379](http://digital.library.colostate.edu/cdm4/document.php?CISOROOT=/cowaters&CISO_PTR=4681&CISOSHOW=4379);

[http://digital.library.colostate.edu/cdm4/document.php?CISOROOT=/cowaters&CISO\\_PTR=5539&CISOSHOW=4888](http://digital.library.colostate.edu/cdm4/document.php?CISOROOT=/cowaters&CISO_PTR=5539&CISOSHOW=4888)

Straskraba, V. and R.E. Moran, 1990. Environmental Occurrence and Impacts of Arsenic at Gold Mining Sites in the Western United States: Proceedings, International Symposium on Acid Mine Water in Pyritic Environments, Lisbon, Portugal.

September 16-19, 1990; *in* Mine Water and the Environment, Volume 9, Numbers 1-4 / March, 1990, Springer Berlin / Heidelberg; available at:

[http://www.imwa.info/bibliographie/09\\_14\\_181-191.pdf](http://www.imwa.info/bibliographie/09_14_181-191.pdf) ;

<http://www.springerlink.com/content/m1721074878301j4/> [abstract].

Moran, R.E., 1990. Environmental Constituents in the Rocky Flats Area - Non-Facility Related Sources Pertinent to Water Quality. Prepared for Advanced Sciences Inc., December 10, 1990.

Patton, C.A., K.M. McGaffey, J.L. Ehrenzeller, R.E. Moran, and W.S. Eaton. "The Hazard Ranking System: Special Considerations for Mining Sites." Presented at the 8th Annual Regional Environmental Business & Management Conference & Expo, Denver, Colorado. October 1994.

Patton, C.A., K.M. McGaffey, J.L. Ehrenzeller, R.E. Moran, and W.S. Eaton. "Superfund Listing of Mining Sites." Presented at the Conference on Tailings & Mine Waste '95, Colorado State University, Fort Collins, Colorado. January 1995.

Moran, R.E. and S. Mernitz. "Acid Mine Drainage and Political Conflicts in the Third Party EIS: Water Resources at Risk." Amer. Instit. of Hydrology, editors Hotchkiss, W.R. et. al., p. RA-36, Minneapolis, Minnesota. 1995.

Davidson, R.R., Peter A. Stauffer, and R.E. Moran, Tailings Impoundment Design -- Striving for Balance, January 1996, *in* Tailings and Mine Waste '96; Proceedings of the Third International Conference on Tailings and Mine Waste, Colorado State University, Fort Collins, Colorado, p. 83-90, A.A. Balkema, Rotterdam.

[http://books.google.com/books?id=24-](http://books.google.com/books?id=24-RHMZx3ksC&pg=PA83&lpg=PA83&dq=robert+e.+moran,+water&source=web&ots=PXxi0S_7hb&sig=69RrMICu0wUTrbPHIErb8tMAuk)

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Moran, Robert E., 1997, Is This Scenario To Your Liking?—Water Quality Predictions In Mining Impact Studies: Abstract, Geological Soc. of Amer. Annual Mtg., (Symposium on Predictive Modeling in the Earth Sciences: Application and Misapplication to Environmental Problems), Salt Lake City, UT, Oct.20-23, 1997.

Moran, Robert E., Sept. 1998, Misuse of Water Quality Predictions in Mining Impact Studies (DRAFT): presented at the Geological Society of America's Workshop on Predictions in the Earth Sciences: Use and Misuse in Policy Making, Estes Park, Colo.

Moran, Robert E., 1998, Cyanide Uncertainties—Observations on the Chemistry, Toxicity, and Analysis of Cyanide in Mining-Related Waters: Mineral Policy Center Issue Paper No.1, 16 pg., Wash., D.C. (available at:

<http://www.earthworksaction.org/pubs/cyanideuncertainties.pdf>

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[http://www.isse.ucar.edu/prediction/report1/case\\_histories.html](http://www.isse.ucar.edu/prediction/report1/case_histories.html)

<http://www.earthworksaction.org/ewa/pubs/cyanideuncertainties.pdf>

and at: <http://www.mineralresourcesforum.org/technical/cyanide/cyanidem.htm>).

Moran, Robert, 1999, A Review of Water Quality Aspects of the San Roque Multipurpose Project, Philippines. Prepared for International Rivers Network. <http://www.irn.org/programs/sanroque/moran.tech.html>

Moran, Robert E., 2000, Cyanide in Mining: Some Observations on the Chemistry, Toxicity and Analysis of Mining-Related Waters: *in* Proc. Central Asia Ecology—99, Lake Issyk Kul, Kyrgyzstan, June, 1999. [Available at

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Moran, Robert E., 2000, Is This Number To Your Liking? Water Quality Predictions in Mining Impact Studies, p. 185-198, *in* Prediction: Science, Decision Making and the Future of Nature. D. Sarewitz, R. Pielke, Jr., and R. Byerly, Jr., eds., Island Press, Washington, D.C., 405 pg.

[http://www.unc.edu/~mwdoyle/riverretreat2009/Moran\\_2000.pdf](http://www.unc.edu/~mwdoyle/riverretreat2009/Moran_2000.pdf)

Moran, R. E., 2000, Mining Environmental Impacts—Integrating an Economic Perspective (DRAFT): Centro De Investigacion Y Planificacion Del Medio Ambiente, Santiago, Chile: Internet Forum on Export Markets and the Environment

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